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THE ROLE OF FIRE IN ASPEN ECOLOGY

Norbert V. DeByle

ABSTRACT: The tree with the widest range in North America, quaking aspen (*Populus tremuloides*), occurs on more than 7 million acres (2.86 million ha) in the nine interior Western States (Colorado, Utah, New Mexico, Wyoming, Arizona, Idaho, Montana, South Dakota, and Nevada). About 65 percent of the land is in public ownership; this includes many acres of wilderness at mid to high elevations.

Aspen is seral on most sites. It colonizes and dominates burns, clearcuts, and other disturbed locations. Maximum aspen biomass is attained between 50 and 100 years after stand establishment. Some time later, between 200 and 400 years, the aspen is often replaced by conifers on most cool-wet sites and with shrubs and grass on warm-dry sites. Aspen on many sites in the West, however, is quite stable and may remain for centuries without appreciable successional change.

Abrupt destruction of an aspen or mixed aspen-conifer forest, usually through fire or clear-cutting, sets back plant succession and results in a stand of aspen root suckers. Hundreds of suckers may come from the roots of a single parent tree; thus, a scattering of aspen trees can be transformed by fire into a complete stand of aspen suckers. Even though aspen seed is produced in abundance, successful regeneration from seed is rare in the montane West.

Aspen possesses several characteristics that make it a likely dominant tree on any burned area that contained a detectable aspen component before burning. These are:

1. Aspen trees are readily killed with fire; they have thin, smooth bark that has little heat resistance.

2. The root systems of these killed trees send up a profusion of suckers (sprouts) for a couple of years. Thus, 150 mature aspen per acre in the preburn forest may easily produce 30,000 sprouts per acre within 2 years after a fire.

3. Aspen root suckers grow rapidly by extracting water, nutrients, and foods from an extant root system and may outcompete most other woody vegetation.

4. Following a burn, a new, even-aged, closed-canopy, aspen forest can develop within a decade. This pioneer species grows best in even-aged stands in full sunlight.

5. In contrast to many conifers, dense stands of aspen suckers are self-thinning. Without intervention, a mature forest of healthy trees will develop from the densest of sucker stands.

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